



# METACOGNITIVE AWARENESS AND ACADEMIC ACHIEVEMENT OF HIGHER SECONDARY LEVEL SCIENCE STREAM STUDENTS OF DIBRUGARH DISTRICT, ASSAM

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## ABSTRACT

Metacognition is concerned with an individual's knowledge about his or her own cognitive processes. Metacognitive Awareness help students assess the task, plan an appropriate approach, apply selected strategies and monitor progress, evaluate and also adjust their strategies. Hence, the present study was undertaken by the Investigators to explore the metacognitive awareness and academic achievement of Higher Secondary level Students of Science Stream of Dibrugarh District. A sample of 115 students of XII Standard was selected by using purposive sampling technique for the investigation. The standardized tool 'Metacognitive Awareness Inventory' (MAI) developed by Schraw and Dennison (1994) has been used as a measure of metacognitive awareness of students. The Descriptive Survey method was used to collect the data. Mean, Standard Deviation, 't' test, correlation 'r' have been employed to analyze the data. The finding of the study reveals that there is a negative correlation between Metacognitive awareness and academic achievement, Knowledge of cognition and Academic Achievement, Regulation of cognition and academic achievement of the Higher Secondary level Science Stream Students. There is a significant difference between Higher Secondary level Science Stream Students with respect to Gender, Type of management, Locale and Medium of Instruction.

**KEYWORDS:** Metacognition, Metacognitive Awareness, Academic Achievement, Higher Secondary level Science Stream Students, Knowledge of Cognition, Regulation of Cognition.

## 1. INTRODUCTION

Metacognition is concerned with an individual's knowledge about his or her own cognitive Flavell's (1976) in which he referred to metacognition as being "...the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective". Schraw (1998) studied two aspects of meta-cognition, knowledge of cognition and regulation of cognition, and how they are related to domain-specific knowledge and cognitive abilities.

Schraw & Sperling Dennison (1994) defined, "*Metacognition as the ability to reflect upon, understand and control one's learning.*"

Thus the concept of Metacognition includes two components – (a) **Knowledge of cognition** and (b) **Regulation of cognition**. **Knowledge of cognition** deals with all the concepts, which are related to our thinking processes, includes all those mechanisms through which we regulate our thinking process, such as orientation, planning, monitoring, testing, repairing, evaluating, reflecting etc. This dimension includes Declarative, Procedural, and Conditional knowledge as its sub-dimensions. **Regulation of Cognition** occurs when individuals modify their thinking; it is a sequential process that one uses to control cognitive activities, and to ensure that a cognitive goal has been met. This dimension includes Information Management, Planning, Monitoring, Debugging, and Evaluation as its sub-dimensions.

## 2. NEED AND SIGNIFICANCE OF THE STUDY

"To make an individual metacognitively aware is to ensure that the individual has **learned how to learn**" (Garner, 1988). Metacognition is an instructional approach which emphasizes the development of thinking skills and process as a means to enhance learning. This objective is to enable all students to become more strategic, self-reliant, flexible and productive in their learning endeavors.

Researcher's conducted by Norehan Zulkiply (2006), Ibe (2009), S. Rajkumar (2010), V.Devaki and A. Mary Lily Pushpam (2011), Mahesh Narayan Dixit (2011), Divya Narang and Sarita Saini (2013), Rekha Rani, Punita Govil (2013), G. Jayaprabha (2013), A.S. Jagadeeswari and V. Chandrasekaran (2014), Dr. Indu.H and G. Viniitha (2015), showed various impacts of metacognitive awareness and academic achievements among students.

With the criteria in mind, the present study was felt to be the need of the hour and was chosen by the Researcher's to find out the opinion of the students studying in Science Stream, with respect to Gender, Type of management, Locale and Medium of Instruction. Moreover the researcher also tries to find out the relationship between Metacognitive Awareness and Academic Achievement in relation to various variables of Higher Secondary level Science Stream Students. Thus, this study will enable to have awareness of Metacognition towards successful academic achievement among the students. To have awareness of one's thought, this is important for developing an understanding of ideas, concepts and problems.

Effective academic learning requires high and sustained intellectual efficiency which requires high cognition which will enable towards successful academic achievement among the students. Besides these, this study can aware the students to plan their work properly, know how to manage the information available, monitor their own progress and evaluate them periodically, correct their mistakes in time and are always aware of their knowledge and can lead to meaningful learning in all the disciplines, where students can meaningfully grasp the material to be studied and improve their academic performance and achievement.

## 3. STATEMENT OF THE PROBLEM

The present study is entitled as: "**Metacognitive Awareness and Academic Achievement of Higher Secondary Level Science Stream students of Dibrugarh District, Assam**"

## 4. OBJECTIVES OF THE PRESENT STUDY

- 4.1. To study the Metacognitive Awareness of Higher Secondary level science Stream students of Dibrugarh District in relation to their Academic Achievement.
- 4.2. To compare the Metacognitive Awareness of Higher Secondary level Science Stream students of Dibrugarh District in relation to their:
  - i. Gender (Male and Female)
  - ii. Type of management (Private and Provincialised)
  - iii. Locale (Rural and Urban)
  - iv. Medium of Instruction (Assamese and English)
- 4.3. To study the relationship between Knowledge of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.
- 4.4. To study the relationship between Regulation of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

## 5. HYPOTHESES OF THE PRESENT STUDY

- H<sub>1</sub>: There is no significant relationship between Metacognitive Awareness and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.
- H<sub>2</sub>: Male and female Higher Secondary level Science Stream students of Dibrugarh District do not differ significantly with respect to Metacognitive Awareness.
- H<sub>3</sub>: Higher Secondary level Science Stream students studying at Provincialised and Private Institutions of Dibrugarh District do not differ significantly with respect to Metacognitive Awareness.

**H<sub>1</sub>:** There is no significant difference between Rural and Urban Higher Secondary level Science Stream students of Dibrugarh District with respect to Metacognitive Awareness

**H<sub>2</sub>:** There is no significant difference between Higher Secondary level Science Stream students of Assamese medium and English medium of Dibrugarh District with respect to Metacognitive Awareness.

**H<sub>3</sub>:** There is no significant relationship between Knowledge of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

**H<sub>4</sub>:** There is no significant relationship between Regulation of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

## 6. OPERATIONAL DEFINITION

**6.1. Metacognitive Awareness:** Metacognitive Awareness refers to awareness of one's own knowledge-what one does and doesn't know-and one's ability to understand, control, and manipulate one's cognitive processes.

Hence, in the present an attempt has been made to study the Metacognitive Awareness of Higher Secondary level Science Stream Students in relation to various aspects. It will be interpreted with the scores obtained in the Metacognitive Awareness Inventory (MAI) constructed and standardized by Schraw and Dennison (1994).

**6.2. Academic Achievement:** Academic achievement is the outcome of education-the extent to which a student has achieved their education goals. It represents performance outcomes that indicate the extent to which a student has accomplished specific goals that were the focus of activities in instructional environments, specifically in Educational Institutions.

In the present study, Academic Achievement will be interpreted with the marks obtained in the Class XI, Higher Secondary First year Examination conducted by the Assam Higher Secondary Education Council (AHSEC) of the Academic session 2014-2015 of the selected sampled Educational Institutions of Dibrugarh District (Lahowal Block) under the study.

## 7. METHODOLOGY

**7.1. Method:** Descriptive Method was adapted to study the Metacognitive Awareness of Higher Secondary Level Students of Science Stream of Dibrugarh District.

**7.2. Tool Selected for the Study:** The Researcher adapted Schraw and Dennison's (1994) Metacognitive Awareness Inventory (MAI), (with due permission from the Authors). The inventory consisted of 52 items, based on five point Likert scale ranging from "strongly agree" to "strongly disagree" and consists of two components: Knowledge of Cognition and Regulation of Cognition. The internal consistency reliability coefficient was 0.9.in its first use by its developers (Schraw and Dennison, 1994) and a correlation 'r' of 0.5.

For convenience of the study, the scale has also been translated into Assamese language by the Researcher's which was administered upon 92 students of Class XII students studying in Dibrugarh District.

Content Validity was used to determine the validity of the scale. The Split Half Technique of finding reliability was decided as appropriate by considering the nature and purpose of the scale and the reliability was found to be 0.52.

**7.3. Academic Achievement:** In the present study, for the Academic Achievement of the class XII students, marks obtained in the Class XI Higher Secondary (First year) Examination conducted by the Assam Higher Secondary Education Council (AHSEC) of the Academic session 2014-2015, were collected from the respective Administrative office of the concerned Institutions.

**7.4. Sample:** A sample of 134 students of Higher Secondary Level of Science Stream has been selected by using Purposive Sampling technique for the present study and Incidental Sampling Method has been used to collect data from the students studying at Higher Secondary Level Educational Institutions class XII of Dibrugarh District.

**7.5. Statistical Techniques Used:** For the present study, Mean, Standard Deviation, Standard Error of Difference, t-test, Co-efficient of Correlation 'r', were used to analyze the data.

## 8. ANALYSIS, INTERPRETATION AND DISCUSSION OF DATA

**8.1. Relationship of Metacognitive Awareness of Higher Secondary Level Science Stream Students of Dibrugarh District with respect to Academic Achievement**

**H<sub>1</sub>:** There is no significant relationship between Metacognitive Awareness and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

**TABLE NO. 1:**

**Table shows Mean, Standard Deviation, and 'r' and relationship between Metacognitive Awareness and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.**

SL. NO.	VARIABLES	N	MEAN	SD	df	'r'	INFERENCE
1.	Metacognitive Awareness	115	194.73	23.56	113	-0.011	Not Significant at 0.05 level
2.	Academic Achievement		50.40	9.94			

The table reveals that computed value of 'r' = (-0.011) is smaller than the tabulated value of 'r' (0.174), with 113 df, and is considered to be not significant at 0.05 level of significance. Thus, the hypothesis "There is no significant relationship between Metacognitive Awareness and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District" is accepted and concluded that there is no significant relationship and there is a negative correlation between Metacognitive Awareness and Academic Achievement of Higher Secondary level students studying at Science stream.

The findings of this objective contradict the findings of V. Devika and A. Mary Lily Pushpam (2011) which revealed a significant positive relationship. Moreover, it also contradict the findings of Ibe, 2009; S. Rajkumar, 2010 which revealed metacognitive strategies were more effective in enhancing academic achievement of science students.

### 8.2. Comparison of Metacognitive Awareness of Higher Secondary Level Science Stream Students of Dibrugarh District in Relation to Gender

**H<sub>2</sub>:** Male and female Higher Secondary level Science Stream students of Dibrugarh District do not differ significantly with respect to metacognitive awareness.

**TABLE NO.2:**

**Comparison of Metacognitive Awareness of Higher Secondary level Science Stream students of Dibrugarh District in relation to Gender**

Dimensions	Gender	N	Mean	SD	SED	df	t value	Inference
Metacognitive awareness	Male	63	188.4	23.05	4.15	113	2.76	Significant at 0.05 level
	Female	52	199.9	21.65				

The table reveals that computed value of 't' was found to be 2.76 of male and female which is greater than the tabulated value of 't' (1.98), with 113 df, and is considered to be significant at 0.05 level of significance. Thus, the null hypothesis is rejected and is concluded that Male and female Higher Secondary level Science Stream students of Dibrugarh District differ significantly with respect to metacognitive awareness.

The result of the present objective contradicts the results of Noren Zulkipli (2006), found no significant difference in Metacognitive Awareness between Male and Female across all academic year. On the other hand the objective supports, Dr. Indu.H and G. Vinitha (2015) found significant difference in Metacognitive Awareness of students based on Gender.

### 8.3. Comparison of Metacognitive Awareness of Higher Secondary Level Science Stream Students of Dibrugarh District in Relation to Type of Management

**H<sub>3</sub>:** Higher Secondary level Science Stream students studying at Provincialised and Private Institutions of Dibrugarh District do not differ significantly with respect to Metacognitive Awareness.

**TABLE NO: 3**

**Table shows Comparison of Metacognitive Awareness of Higher Secondary level Science Stream students of Dibrugarh District in relation to Type of Management.**

Dimensions	Type of Management	N	Mean	SD	SED	df	t value	Inference
Metacognitive awareness	Private	77	190.46	22.10	3.92	113	2.49	Significant at 0.05 level
	Provincialised	38	200.21	23.88				

The table reveals that computed value of 't' was found to be 2.49 of Private and Provincialised which is greater than the tabulated value of 't' (1.98), with 113 df, and is considered to be significant at 0.05 level of significance. Thus, the null hypothesis is rejected and is concluded that Private and Higher Secondary level Science Stream students studying at Provincialised and Private Institutions of Dibrugarh District do not differ significantly with respect to Metacognitive Awareness.

The result of the present objective supports the results of A.S.Jagadeshwari and V. Chandrasekaran (2014) who found that there is significant difference in the Metacognitive Awareness among Higher Secondary students with regard to Type of Management.

#### 8.4. Comparison of Metacognitive Awareness of Higher Secondary Level Science Stream Students of Dibrugarh District in Relation to Locale

H<sub>4</sub>: There is no significant difference between Rural and Urban Higher Secondary level Science Stream students of Dibrugarh District with respect to Metacognitive Awareness

TABLE NO: 4

Table shows Comparison of Metacognitive Awareness of Higher Secondary level Science Stream students of Dibrugarh District in relation to Locale.

Dimensions	Locale	N	Mean	SD	SED	df	t value	Inference
Metacognitive awareness	Rural	35	186.22	27.26	2.53	113	4.24	Significant at 0.05 level
	Urban	80	196.95	20.30				

The table reveals that computed value of 't' was found to be 4.24 of students of Rural and Urban Institutions which is greater than the tabulated value of 't' (1.98), with 113 df, and is considered to be significant at 0.05 level of significance. Thus, the null hypothesis is rejected and concluded that there is a significant difference between Rural and Urban Higher Secondary level Science Stream students of Dibrugarh District with respect to Metacognitive Awareness.

The result of the present objective supports the results of Rekha Rani, Punita Govil (2013) who found that Metacognitive level of Urban students differs significantly from their Rural counterpart.

#### 8.5 Comparison of Metacognitive Awareness of Higher Secondary Level Science Stream Students of Dibrugarh District in Relation to Medium of Instruction.

H<sub>5</sub>: There is no significant difference between Higher Secondary level Science Stream students of Assamese medium and English medium of Dibrugarh District with respect to Metacognitive Awareness.

TABLE NO: 5

Table shows Comparison of Metacognitive Awareness of Higher Secondary level Science Stream students of Dibrugarh District in relation to Medium of Instruction.

Dimensions	Medium of Instruction	N	Mean	SD	SED	df	t value	Inference
Metacognitive awareness	Assamese	35	186.22	27.26	2.53	113	4.24	Significant at 0.05 level
	English	80	196.95	20.30				

The table reveals that computed value of 't' was found to be 4.24 of students of Assamese medium and English medium students, which is greater than the tabulated value of 't' (1.98), with 113 df, and is considered to be significant at 0.05 level of significance. Thus, the null hypothesis is rejected and concluded that there is a significant difference between Higher Secondary level Science Stream students of Assamese medium and English medium of Dibrugarh District with respect to Metacognitive Awareness.

The result of the present objective supports the results of Dr. Indu.H and G. Vinitha (2015) who found that there is significant difference in the Metacognitive Awareness of students based on medium of instruction.

#### 8.6 Relationship between Knowledge of cognition and Academic Achievement of Higher Secondary Level Science Stream Students of Dibrugarh District

H<sub>6</sub>: There is no significant relationship between Knowledge of cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

TABLE NO. 6:

Table shows Mean, Standard Deviation, and 'r' and relationship between Knowledge of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

SL. NO.	VARIABLES	N	MEAN	SD	df	'r'	INFERENCE
1.	Knowledge of cognition	115	59.43	11.07	113	0.003	Not Significant at 0.05 level
2.	Academic Achievement		50.19	10.01			

The table reveals that computed value of 'r' = (0.003) is smaller than the tabulated

value of 'r' (0.174), with 113 df, and is considered to be not significant at 0.05 level of significance. Thus, the hypothesis "There is no significant relationship between Knowledge of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District." is accepted and concluded that there is no significant relationship and there is a very low and negligible correlation between Metacognitive Awareness and Academic Achievement of Higher Secondary level students studying at Science stream.

#### 8.7 Relationship between Regulation of Cognition and Academic Achievement of Higher Secondary Level Science Stream Students of Dibrugarh District

H<sub>7</sub>: There is no significant relationship between Regulation of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

TABLE NO. 7:

Table shows Mean, Standard Deviation, and 'r' and relationship between Regulation of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

SL. NO.	VARIABLES	N	MEAN	SD	df	'r'	INFERENCE
1.	Regulation of cognition	115	134.25	25.14	113	-0.005	Not Significant at 0.05 level
2.	Academic Achievement		50.19	10.01			

The table reveals that computed value of 'r' = (-0.005) is smaller than the tabulated value of 'r' (0.174), with 113 df, and is considered to be not significant at 0.05 level of significance. Thus, the hypothesis "There is no significant relationship between Regulation of Cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District." is accepted and concluded that there is no significant relationship and there is a negative low correlation between Metacognitive Awareness and Academic Achievement of Higher Secondary level students studying at Science stream.

#### 9. MAJOR FINDINGS OF THE STUDY

9.1. There is a negative correlation between Metacognitive Awareness and Academic Achievement of Science Stream of Higher Secondary level students of Dibrugarh District.

9.2. Male and female Higher Secondary level Science Stream students of Dibrugarh District differ significantly with respect to metacognitive awareness.

9.3. Higher Secondary level Science Stream students studying at Provincialised and Private Institutions of Dibrugarh District differ significantly with respect to Metacognitive Awareness.

9.4. There is a significant difference between Rural and Urban Higher Secondary level students of Science Stream of Dibrugarh District with respect to Metacognitive Awareness.

9.5. There is a significant difference between Higher Secondary level students of Science Stream of Assamese medium and English medium of Dibrugarh District with respect to Metacognitive Awareness.

9.6. There is no significant relationship and there is a very low and negligible correlation between Knowledge of cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

8.7. There is no significant relationship and there is a negative low correlation between Regulation of cognition and Academic Achievement of Higher Secondary level Science Stream students of Dibrugarh District.

#### 9. CONCLUSION

Metacognition is important in learning and is a stronger predictor of academic success (Dunning et al. 2003). Students with good metacognition demonstrate good academic achievement compared to students with poor metacognition. Students with poor metacognition may benefit from metacognitive training to improve their metacognition and academic achievement (Kruger and Dunning 1999). Therefore, the results indicate that the contribution of metacognition is imperative for good academic achievement and successful learning in adolescents. It must be fostered among the students to make them better learners. The various types of knowledge such as declarative knowledge; to have awareness about the factual information that one knows, procedural knowledge; to follow systematic way of dealing with problems or tasks, and conditional knowledge; to know how and when to use the procedures effectively for solving the problems are necessary for meaningful learning so as to improve academic achievement. This shall certainly go a long way in making them lifelong learners, problem solvers and successful in academics.

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